ISSUE: MARCH 1997

LISTing Policy ..... Annual Dues $14.00

# LISTings

Newsletter of the Long Island Sinclair / Timex Users' Group

## 15 YEARS AND STILL GOING STRONG!

| | |
|---|---|
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| Vice Pres. | Bob Gilder |
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| Cor. Secy. | John Pazmino |
| Assoc. Editors | Fred Stern |
| | Harvey Rait |
| Publisher | Bob Gilder |
| Libr. | Tom Skapinski |

Please send all inquiries and submissions (including dues) to: L.I.S.T.
Mr. Harvey Rait
5 Peri Lane,
Valley Stream, N. Y. 11581

COMING EVENTS: The next L.I.S.T. meeting will be Sunday, Ø4/13/97 at 2 P.M. at the home of Harvey Rait (see address above).

## NEXT MEETING APRIL 13, 1997

*On e sample copy sent upon receipt of business size SASE. Copies provided on Exchange basis with other Bona fide user groups. We are always looking for articles, programs, reviews, etc to keep members informed and entertained. You maintain full credit and copyright.*

## NOTICE:

Harvey Rait, LIST president has been hospitalized for approximately four weeks. We wish Harvey a speedy recovery. If you like, you can call Harvey by telephone at 516-763-3731 or if you wish, you can send Harvey a card. I am sure Harvey would appreciate hearing from our members.

## WEDGE WORKS ..... by Fred Stern

By popular demand, and the request of my friends at LIST, I am writing for LISTing again. Since my love is still the ZX-81/TS1000, I decided to name my column "Wedge Works". It will be of course devoted to both old and new information about the "Black Wedge".

Every thing Old is New Again

I have been in contact with Mr. Peter Liebert-Adelt. Peter has advised me that the German ZX Team has 70 members who use and work with the ZX-81. They are trying to develop improved peripherals and find new uses for the computer. I will keep you all advised of their doings.

"Comp. Sys. Sinclair"

Well I did it. I purchased a Packard Bell PC Pentium 75 MHZ processor, 1 gigabyte hard drive, 4 speed CD-Rom etc, etc. My son Michael and daughter Jennifer love it, and find it very useful doing research for homework. My problem is they don't let me use it! I have to wait until they are asleep, then like a theif in the night, I go into the family room to use the darn thing. It had taken me a few months to learn to use it, get into the various programs and access the internet, but I have done it. I have discovered that on the world wide web, there are a few rooms for Sinclair computer systems. One of which I have found is Comp.SYS.SInclair. In it I have found various articles and correspondence by fellow and lady Sinclairists.

These articles are geared to all Sinclair (and TIMEX) computers; ZX-81, Spectrum( TS 1000, TS 2068 and QL. One project which I am working on is to access the internet and the World Wide Web with my TS 1000 and Westbridge Modem. If you know of anyone who has done it, or know how it can be done, please contact me through LIST.

"Final Thoughts"

In the last few months I have spoken to many fellow users in the Timex community. From this I have discovered that Timex is not "Dead". Yes, usage in the USA is not as it use to be, but world wide it is still a popular machine. Also I refer to all models, ZX-81, TS 2068, Spectrum and QL etc. Questions are still being asked, users are seeking support and to a limited end support is still available. I will try to find and make public those who still support us, and direct users needing the support to all the sources.

*Sinclairing You All, Fred Stern*

# QL CORNER

North American QL Show by Bill Cable

Here are the initial details for the 1997 North American QL Show in Bedford, PA. Although Bedford is on an interstate exit this is basically a rural area. There is no public transportation but the restaurant is within walking distance.

Date of the Show:

Carriage House Restaurant
Exit 11 off the I-70 & I-76 Interstate
Bedford, Pennsylvania USA
Phone: (814) 623-1174

Bedford is half way between Harrisburg and Pittsburg on Interstates I-70 and I-76

Time of the show: 9 AM - 4 PM

Format of the show:

The show will include talks and demonstrations by well known QL personalities and sales by a number of vendors. The show will take place in the main dining room of the restaurant and lunch is included in the admission to the show. After the show a banquet will be held at the same restaurant at 6 PM Saturday evening. All the newest QL hardware and software will be there to see and purchase.

Admission Fees:

$12.00 per person if you notify Bill Cable in advance
$15.00 per person at the door

This includes admission to the show and LUNCH and general refreshments throughout the day.

Recommended Motel:

Super 8 Motel
Business Rte 220 North
Bedford, PA 15522
Phone: (814) 623-5880 FAX: (814) 623-5880

Also at Exit 11 of the I-70 & I-76 Interstate at Bedford

Rates: Double occupancy with one double bed $40.91. Double occupancy with 2 separate beds &44.72.

When you make your reservation mention Bill Cable and the QL show to get this special rate. The rate is perday.

There are 57 units, exercise equipment, HBO, free local calls, waterbeds, children under 12 free.

Recommended Airports:

Dulles International Airport Washington, DC
This is about 2 hours by car to Bedford.

Pittsburg Airport
About 2 hours by car to Bedford.

Harrisburg Airport
About 2 hours by car to Bedford

A more detailed agenda will be released sometime in February/March. There will be a dinner gathering 6 PM Friday night also at the Carriage House Restaurant. Those flying in to airports and needing rides to the show, please contact Bill Cable and every attempt will be made to connect you with a local QL person going to the show who can meet you and give you a ride. Likewise, QL people driving to the show who would like to give a ride to a QL enthusiast from far away please contact Bill Cable.

This is the 5th annual North American QL Show. It is being sponsored by NESQLUG (The New England Sinclair Users Group) and all details are being handled by:

Bill Cable
NESQLUG Director
RR3 Box 92
Cornish, NH 03745 USA
Phone: (603) 675-2218
E-Mail: bcable@triton.coat.com

I have asked Bob Malloy if he would prepare an outline on how to access the Internet and which modem software should we use. Bob stated that QTPI is probably the best software for accessing the internet and it is a Freeware program and you can order the program from QJH Freeware, Timothy C. Swenson, 5615 Botkins Rd., Huber Heights, OH 45424. Send a formated disk to Tim with return postage. The program is in zip format. Or if you like you can send me a formatted disk; I will unzip the program onto your disk. 69 Jefferson Place, Massapequa, NY 11758.

See you next month... *Bob Gilder*

## FRAUD WARNING

District Attorney Denis Dillon warns consumers that your name, current address, two previous addresses, mother's maiden name and birthdate are now available to anyone with a credit card through a new Lexis database called P-Trax. This information can be used to commit credit card fraud or otherwise allow someone else to use your identity.

You can have your name and information removed from this list by calling 1-888-965-3947; by faxing your name, address, telephone number and date of birth to 1-800-470-4365 telling them to remove your name from the P-Trax database; or by sending physical mail to Lexis-Nexis, P.O. Box 933, Dayton, Ohio 45401-0933; or via the Internet at www.LEXIS-NEXIS.com.

## Making Professional PC Boards ..... Bob Gilder

LIST has been publishing hardware projects for the ZX-81/TS-1000 and TS-2068/Spectrum. Included in many of the projects are printed circuit board layouts. Transferring the layouts used to be a horrendous job; drawing your PC layout, taking the layout to a photo lab to make a positive of a negative, photo-sentsitize a copper laminate board, developing your PC board using a RFL-2 lamp for 3 1/2 minutes, place your board in a fixer and then wash the board and finally etch the board with ferric chloride, wash the board in running water and soap.

The technology for making a PC board has changed drastically - it is now a simple task with a new product called PnP Blue and PnP Wet. The PC layouts in our hardware projects should be copied on a copier machine. We have to make a transpariency from the copied art work. Turn the copied PC layout and on the back side of the layout pour a little kitchen corn oil on the image. Rub it with a paper towel and let it dry. After a period of drying copy the image from the back side of the image and you will have a mirror image of the art work. Note: For best results you should use a laser copier (Staples office supply).

Now you will have to take a sheet of PnP/Blue or PnP/Wet and place it in the copier paper tray, emulsion side up and print the art work. When the Blue sheet is copied; you will notice that the PC outline has been transferred onto the Blue sheet. At your home you will cut the PC Blue image slightly larger than the actual trace and with a steam Iron, you will iron on the trace, (emulsion side down) onto the PC board. Use a low setting on the steam iron. Keep on working the iron over the image until the traces are black on the copper laminate. Then place the PC board, trace side down in a glass or plasiic tray with ferric acid. Total etching time varies because copper laminate PC boards have different thickness of copper. You can use a tweezer to look at the board to see if your board has been fully etched. If not, place the board into the acid. Once the board has completed etching, rinse it in clear cold water - do this in a small plastic container, then clean the board with a scouring pad until the traces are bright and then the board can be dried. Drill all holes on the PC board and then stuff components into the board. At first, it sounds like hard work; it really isn't! Where can you purchase PnP Blue/Wet? Techniks Inc., P. O. Box 463, Ringoes, NJ 08551. They sell a sample pack of 5 sheets of PnP Blue and 5 sheets of PnP Wet for $20.00. This may seem to be a high price to pay for 10 sheets, however, if you have other friends that may be interested, it could lower the price between all parties.

# Troubleshooting Disk-Drive Power Supplies

## *Cranky floppy-disk-drive write's and read's are sometimes caused by marginal power supplies*

**By Ralph Tenny**

What do you do when a stand-alone floppy-disk drive hasn't given up the ghost but occasionally drops a file or wipes out a directory. If, after cleaning heads and verifying with a test disk that alignment, *et al*, are fine, you might consider that this intermittent problem can be caused by a marginal power-supply design inside the drive's case.

The above scenario can occur even with add-in drives powered from the computer's power supply if the latter is marginally designed, though this is less likely to occur here. In this article, we'll discuss what to look for and, more importantly, how to go about solving the problem. If a poorly designed power supply is what's causing you grief, you'll be able to fix it yourself. If not, at least you'll know where not to look for a gremlin.

### *Disk Power Supplies*

Mini-floppy 5.25-inch and micro-floppy 3.5-inch drives are powered from two different-voltage power-supply rails. A +5-volt rail runs the electronics, while a +12-volt supply delivers driving power to the spindle assembly that revolves the disk inside its jacket or case as well as to the stepper motor that moves the read/write head.

The +5-volt supply that drives the read/write electronics must write data tracks that are both uniform in level and spacing. The motor supply must be designed to deliver a steady +12 volts so that the revolving speed of the disk is uniform and identical for both the read and the write operations. Of course, a very important factor to take into consideration with both power supplies is the demands placed upon them.

An essentially steady load is placed on the +5-volt supply. On the other hand, the +12-volt supply is subjected to a very heavy surge whenever the spindle motor starts up. Once the spindle motor has come up to speed, it settles down to a fairly steady drain on the power supply. Meanwhile, any attempt to access another track requires that the head stepper motor be switched on, placing an additional load on the power supply. The most probable cause of power-supply-related random disk errors is interaction between the +5- and +12-volt supplies.

Properly designed floppy-disk power supplies have adequate isolation between the two voltage rails. In essence, the well-designed supply is actually two *separate* power supplies in one package. A few add-on disk drive power supplies, however, have been designed with what, for want of a better term, we'll call "short-cut engineering." Their performance can range from poor isolation to inadequate current capability and varying degrees of interaction between the two supply rails.

Shown in Fig. 1 is the schematic diagram of a typical well-designed

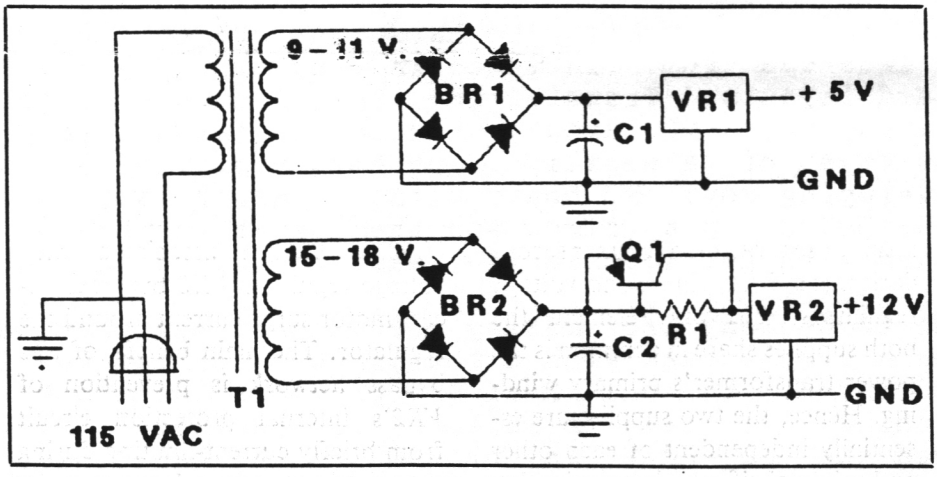


*Fig. 1. Schematic diagram of an ideal +5/+12-volt power supply for a stand-alone floppy-disk drive unit. In this circuit, the two supply rails are derived from virtually independent supplies.*

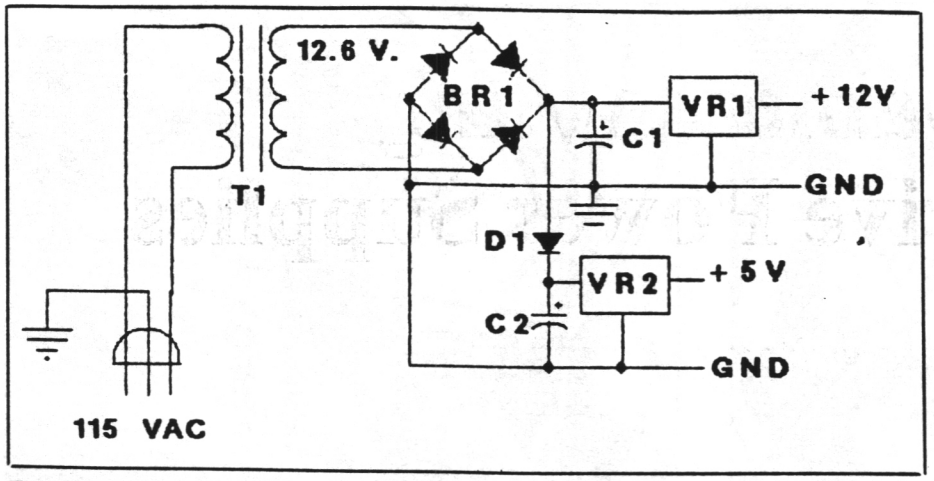


*Fig. 2. An example of the circuit used in some shortcut power-supply designs. The only isolation—minimal at best—between the two supply rails is that provided by D1.*

floppy-disk power supply. Note that the +5- and +12-volt rails are the result of separate transformer secondaries, rectifiers, filters and voltage regulators. The only element the both supplies share in common is the power transformer's primary winding. Hence, the two supplies are essentially independent of each other and minimal, if any, interaction between the two will occur under any loading conditions.

The ac output from each transformer secondary in the Fig. 1 circuit is well in excess of the desired dc voltage at the outputs of the supplies. The lower voltage indicated for each winding should be considered as the minimum usable for solid, reliable performance. That is, the transformer secondary potential in the +5-volt supply shouldn't be less than 9 volts, while the secondary potential in the +12-volt supply shouldn't be less than 15 volts. Additionally, the current ratings of both transformer secondary windings and the rectifier diodes (or bridge assemblies, as the case may be) should be conservatively rated. That is, each should be able to safely pass at least 20 percent more current than would ordinarily be demanded under the heaviest operating load placed on the supplies.

An "extra" feature is also illustrated in the Fig. 1 circuit. The *Q1/R1* network associated with voltage regulator *VR2* bypasses excess motor surge current around the regulator. The main benefit of this bypass network is prevention of *VR2*'s internal protection circuit from briefly current-limiting during the start-up surge placed on the supply by the motor. In turn, this allows the spindle motor to come up to speed as quickly as possible, which is typically about 0.5 second.

Figure 2 is the schematic diagram of a typical short-cut design power supply found in some stand-alone floppy-disk drive cabinets. Notice here that both supply rails are derived from a single power transformer secondary winding and rectifier system. The only components in this system that are separate for each supply are the filter capacitors and voltage regulators. With this particular arrangement some supply isolation is gained with the diode that feeds the filter capacitor for the +5-volt supply.

With a power supply built from the Fig. 2 circuit, the short-cuts used will have the following effects:

(1) The 12.6 volts ac available across the secondary winding of the power transformer is so low that voltage regulator *VR1* can't always stay in regulation unless the ac line potential is at the "normal" 117-volt or greater level. That is, the potential across *C1* will become so low that *VR1* goes into current-limit mode. The result is that the spindle motor will come up to speed more slowly than normal.

(2) If the current ratings of the power transformer and bridge-rectifier assembly are also too low for the load placed on the power supply, the potential on *C2* may "sag" enough for *VR2* to also stop regulating. When this occurs, distruption of the disk read/write circuitry will cause random errors to be generated.

(3) In the event the ac line voltage is also low, the problems mentioned above will be compounded.

## *Locating the Problem*

The following assumes that you are troubleshooting a stand-alone floppy-disk drive unit. Unplug the drive from both the ac line and computer to which it is connected. Open the cabinet and locate the power transformer. Trace the circuitry revealed to identify the transformer leads that go to the 117-volt ac source, usually through a switch and fuse. Verify which leads go to the ac line cord with a continuity checker or ohmmeter from the power cord to the leads.

Having identified the primary leads of the power transformer, count the number of remaining leads. If there are only two leads, in addition to the two for the primary winding, the remaining power supply circuitry will likely be the same as or very similar to that shown in Fig. 2. In the unlikely event that there are three secondary leads on the transformer, the circuit design of the power supply is likely to be the same as in Fig. 3. If you find that there are four secondary transformer leads secondary leads, the schematic diagram of

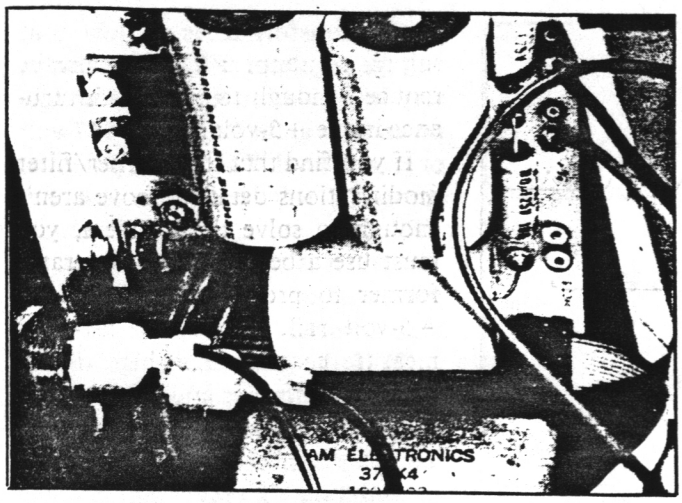

*Fig. 3. An interior view of the power-supply section of a typical stand-alone disk-drive unit.*

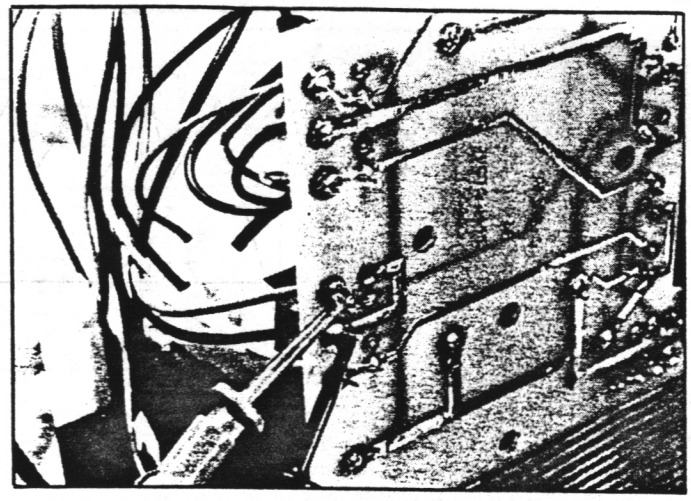

*Fig. 4. The regulator output circuit board with test leads attached for taking voltage measurements.*

the power supply is most likely to resemble Fig. 1.

Shown in Fig. 4 is a photographic view inside a typical floppy-disk drive. In the top-center, you can see two large filter capacitors. Check to see if they are *C1* and *C2* in the Fig. 1 circuit. To the left of *C1* are shown regulators *VR1* and *VR2*.

Power up the drive without the linking flat ribbon cable connected to the computer. Measure the potential across *C1* and *C2* with a dc voltmeter (observe proper polarity). With the drive not running, expect to read at least +12 volts across *C1* and perhaps as much as +20 volts across *C2*.

Next, locate the power cable that attaches to the drive and identify the conductors with the +5 and +12 volts on them. Figure 3 is a photo of a typical output card, this time on a dual-drive power supply. Use your voltmeter to verify that the outputs of the regulators are at the proper levels: +5 volts and +12 volts, both within ±10 percent.

The final test for power-supply problems in your disk-drive system requires access to an oscilloscope and a test program to cycle the drive. The approach used is to set up a program loop that writes to the disk, waits for the motor to turn off and then repeats this cycle endlessly until the program is interrupted by you.

When running the program, monitor the +5- and +12-volt regulated supply rails. Watch for dips in the required voltages when the spindle motor starts up. If neither supply rail's potential dips, you probably don't have a problem with your power supply, regardless of the design of the power supply circuit. The same is probably true if only the +12-volt rail's potential dips. The exception is if the dip slows the motor enough that the software starts reading or writing before the motor is up to speed.

With your disk drive reconnected to the computer and the line cord plugged into an ac outlet, turn on both the computer and drive. Place a formatted disk in the drive, preferably one without any data on it you wish to save. Then key in the following BASIC program, which can easily be translated to any version BASIC interpreter:

After typing RUN followed by a RETURN (or ENTER if this is the designation on your keyboard), if the disk in the drive doesn't stop revolving as

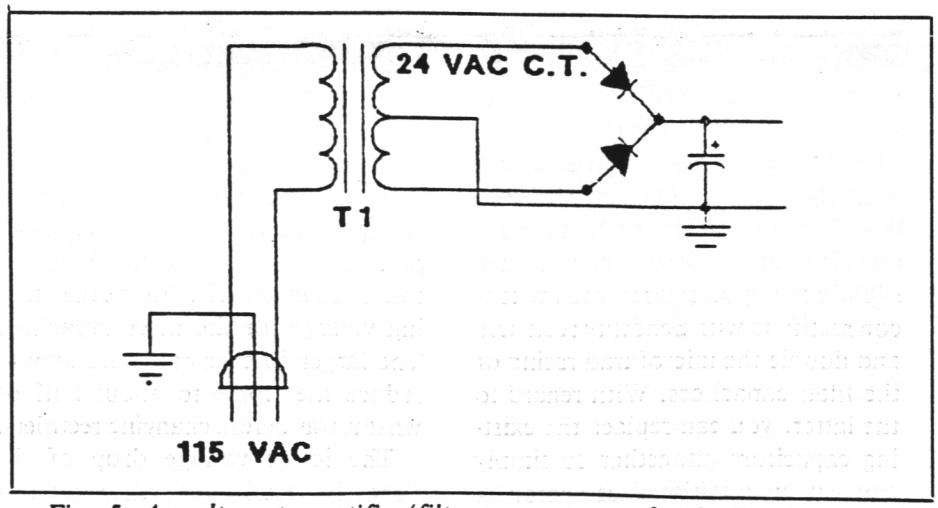


*Fig. 5. An alternate rectifier/filter arrangement for the Fig. 2 circuit.*

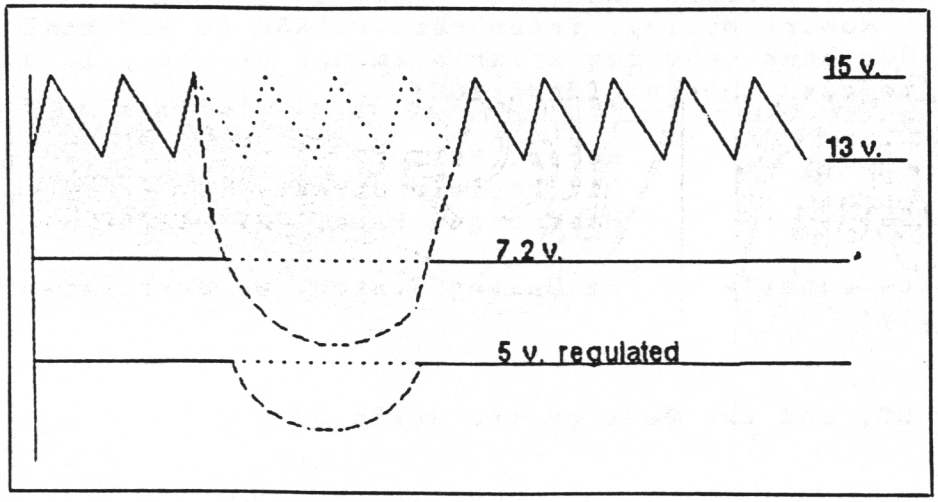


*Fig. 6. Power supply waveforms observed on an oscilloscope screen, along with the sag, illustrated by the dashed lines, that can occur when a drive's spindle motor starts up.*

the program executes, increase the delay in line 50. If the drive is idle for a relatively long time during each cycle, decrease the count in line 50. The optimum is for the motor to just coast to a stop before starting again for another run-through.

## *Solving the Problem*

There are two fixes for the motor-speed problem—fix the power supply or change the software so that it waits longer before beginning a read or write operation. Obviously, the preferable solution is to fix the power supply.

The quickest way to fix a supply that uses the circuit arrangement shown in Fig. 2 is to substitute a transformer that has slightly greater secondary voltage and adequate current capacity—*if* you can find a transformer with appropriate ratings. If the secondary voltage is only slightly low, you can replace the silicon rectifiers with Schottky rectifiers and double the microfarad rating of the filter capacitors. With regard to the latter, you can replace the existing capacitors altogether or simply connect an additional capacitor of the same value in parallel across each of the originals in the proper polarity, assuming there is room in the supply to do so.

Figure 6 both sums up the problems and demonstrates the gains to be made by tweaking the existing power supply. The waveform at the top represents an estimated 2 volts of peak-to-peak ripple on a loaded disk supply built according to the design shown in Fig. 2. The 7.2-volt line represents the maximum drop across the standard three-terminal voltage regulator, and the last line represents the output from the regulator.

A dashed line in Fig. 6 represents a voltage sag caused by the starting surge of the spindle motor. As soon as this surge penetrates the 7.2-volt guard band, the regulator breaks regulation and will probably disrupt the disk electronics.

Schottky rectifiers have significantly lower voltage drop (about 40 percent) than do standard silicon rectifiers. Their use raises the peak charging voltage for the filter capacitor. The larger filter capacitance should reduce the ripple to about half of what it was before changing rectifiers.

The lower voltage drop of the Schottky rectifier further reduces ripple. With a higher voltage to start with and greater reserve, the voltage sag may disappear altogether or be reduced enough to prevent disturbance in the +5-volt supply.

If you find that the rectifier/filter modifications detailed above aren't enough to solve the problem, you must use a beefed up power transformer to prevent sagging on the +5-volt rail. One other last-ditch measure can be taken here. If the disk drive in question is an older unit, you can replace it with a newer, thinner drive that uses a lot less power and works better. The thing to be on the alter for is that you don't inadvertently substitute a quad-density model for a double-density drive. AT-style quad-density disk drives require different diskettes and cannot read from or write to disks that are compatible with the lower-density XT and PC drives.

Except for the earliest models, the power supplies in MS-DOS computers generally have sufficient power to handle a full complement of add-in disk drives and expansion cards. If you encounter a problem with an MS-DOS disk drive, make the same tests detailed above for stand-alone drives, but take your voltage measurements on the drive board, as near as possible to the drive's power connector. If you note a dip in the +5-volt line, there are two possible causes for this: the computer's power supply is overloaded or defective, or there is a high-resistance connection in the power-supply cable.

Schottky rectifiers are fairly difficult to find. If you are having any difficulty here, one source of the 1N5822 Schottky rectifier is Digi-Key, 701 Brooks Ave. S., P.O. Box 677, Thief River Falls, MN 56701-0677. You might think that this rectifier is very expensive when compared to silicon rectifiers of similar rating, but the cost is well worth it considering the benefits obtained. It's much cheaper to buy the needed Schottky rectifiers than to have to replace or even build a new power supply to suit your needs!

ATTENTION LIST Subscribers: When it is time to renew your membership, (look at your mailing label), please make out your check to Harvey Rait, LIST President or to Robert Malloy, Treasurer. PLEASE DO NOT MAKE OUT YOUR CHECK to LIST. Our bank requires a large amount of money in a savings account in order to cash checks. THANK YOU!

Harvey Rait
5 Peri Lane,
Valley Stream, NY 11581

Robert Malloy
412 Pacific Street,
Massapequa Park, NY 11762

Due to rising postage costs outside of the United States, we must raise our annual dues accordingly:

USA postage $16.00
CANADA and MEXICO $17.50 US, and the rest of the world $24.00 US.

Bob Malloy, LIST Treasurer

WHO'S ONLINE

Some of us here at LIST have been wondering how many of our members are using modems with their Sinclair computers. It would be helpful if those of you who are into communications would take a few minutes to let us have the following info.

COMPUTER USED .....
COMMS PRGRM .....
BAUD RATE .....
EMAIL ADDRESS.....
ONLINE SERVICES USED.....
SUGGESTIONS FOR LIST.....

You can reply to me at either of the following addresses:
74776.2342@compuserve.com
bmalloy@chelsea.ios.com (Internet)

Or, you can use our snailmail address.

Bob Malloy

ON LINE

| | |
|---|---|
| Joe LaPunzina | Jpunzi@aol.com |
| Bob Malloy | 74776.2342@compuserve.com |
| Tom Skapinski | tskapins@juno.com |
| Jon Pazmino | john.pazmino@moondog.com |
| Tim Swenson | swensotc@ss2.sews.wpfb.af.mil |
| Bill Cable | bcable@triton.coat.com |
| Mike Jonas | mjonas@bbn.com |
| Gary Norton | gnorton@world.std.com |
| Al Boehm | boehm@plh.af.mil |
| Ed Kingsley | elk4@aol.com |